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B5K K3A3 K3A6 K3A7

(56) Documents cited

GB 2136783 A	**GB 2102729 A**	**GB 2009704 A**
GB 1126292 A	**GB 1070918 A**	**EP 0174688 A1**
EP 0132386 A2	**EP 0033824 A1**	**US 4601927 A**
US 4488658 A	**US 4465205 A**	**US 2998158 A**

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INT CL[4] **B29C 65/00, B65B 7/28, B65D 17/00 41/00 43/00 55/00 77/20 77/30, B67B 3/00 5/00**
Online databases: WPI

(54) Containers

(57) A thermoformed container lid 26 for fixing to a container body 27 has a peripheral skirt portion 28 of axial length substantially equal to that of a container skirt 29 to permit fusion of the free edges of the skirt together to prevent illicit removal of the lid, and the lid skirt has a removable band 22 therearound formed by localised incision(s) or material thinning. Apparatus (Figs. 11, 13) for applying the lid to a container includes means to press the lid onto the body to bring the free edges of the lid and body skirts into the same plane, and means to apply heat and pressure to the free edges to fuse them together.

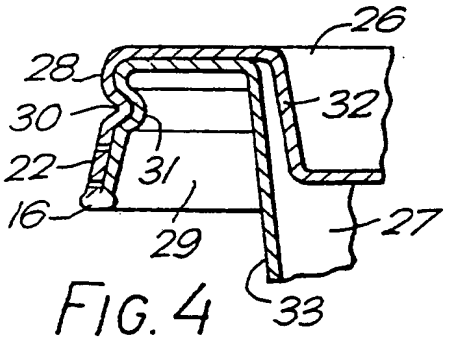

FIG. 4

At least one drawing originally filed was informal and the print reproduced here is taken from a later filed formal copy.

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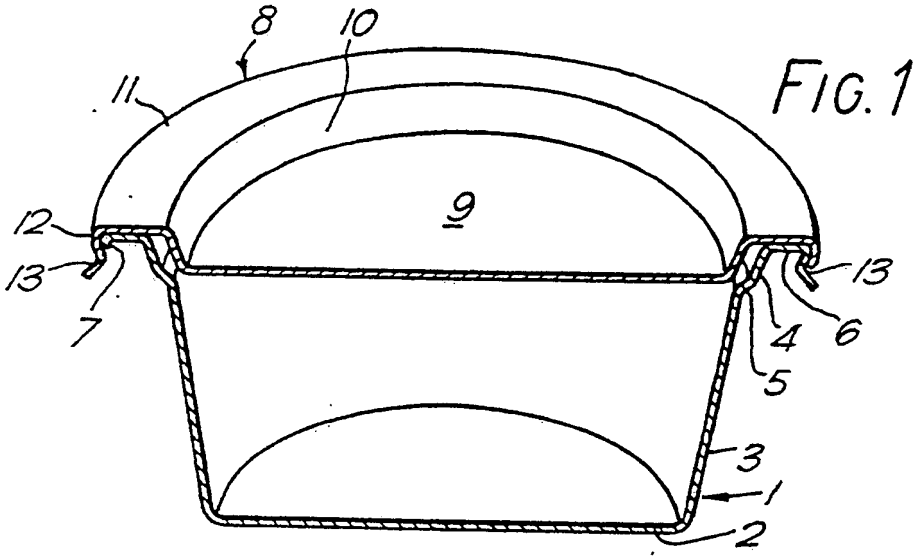


FIG. 1

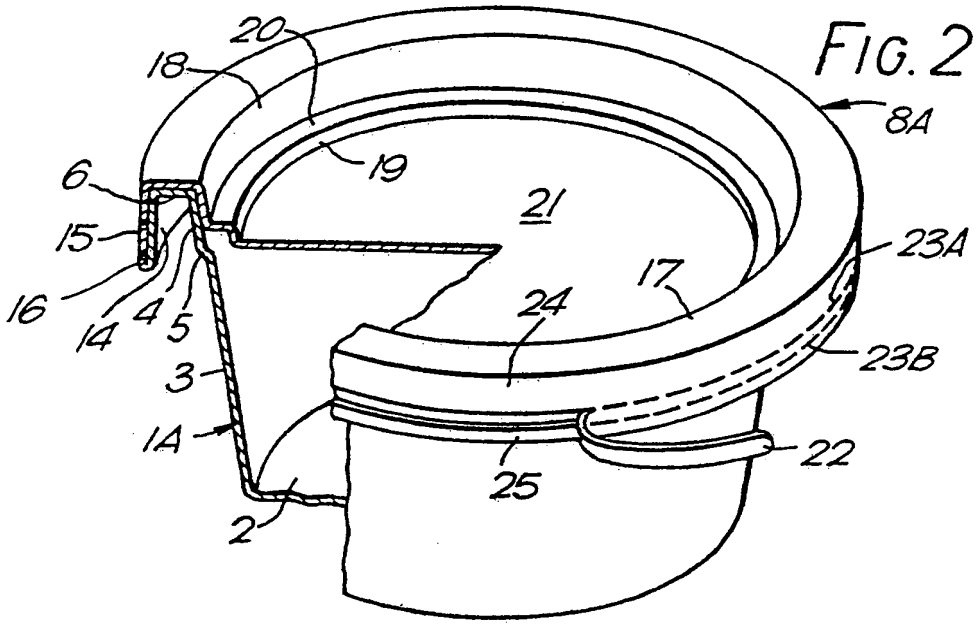


FIG. 2

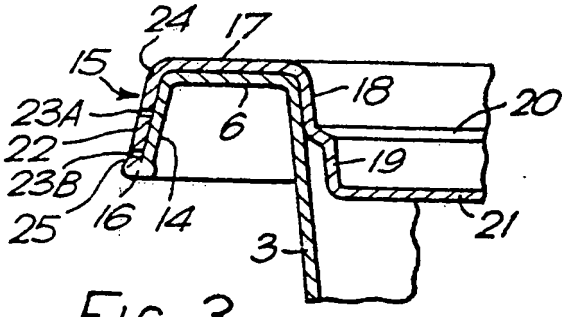


FIG. 3

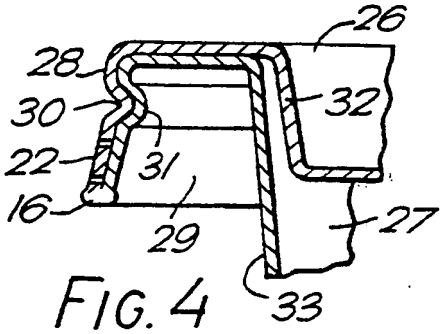
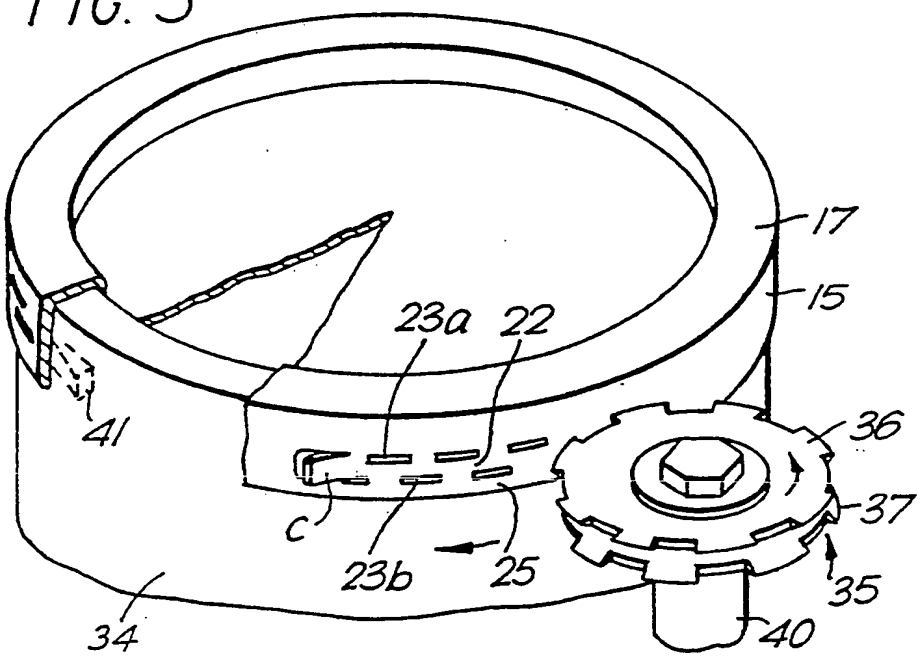


FIG. 4

FIG. 5



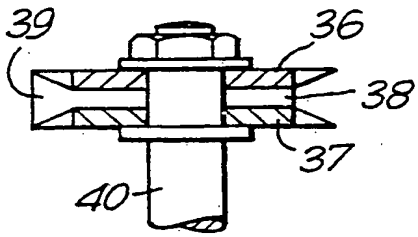


FIG. 6

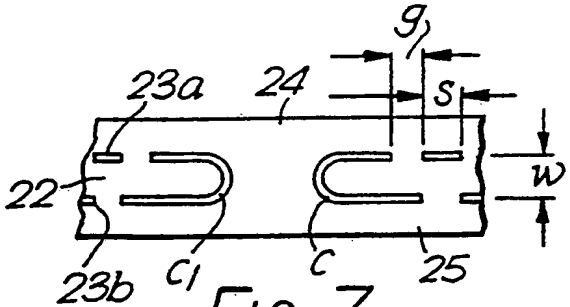


FIG. 7

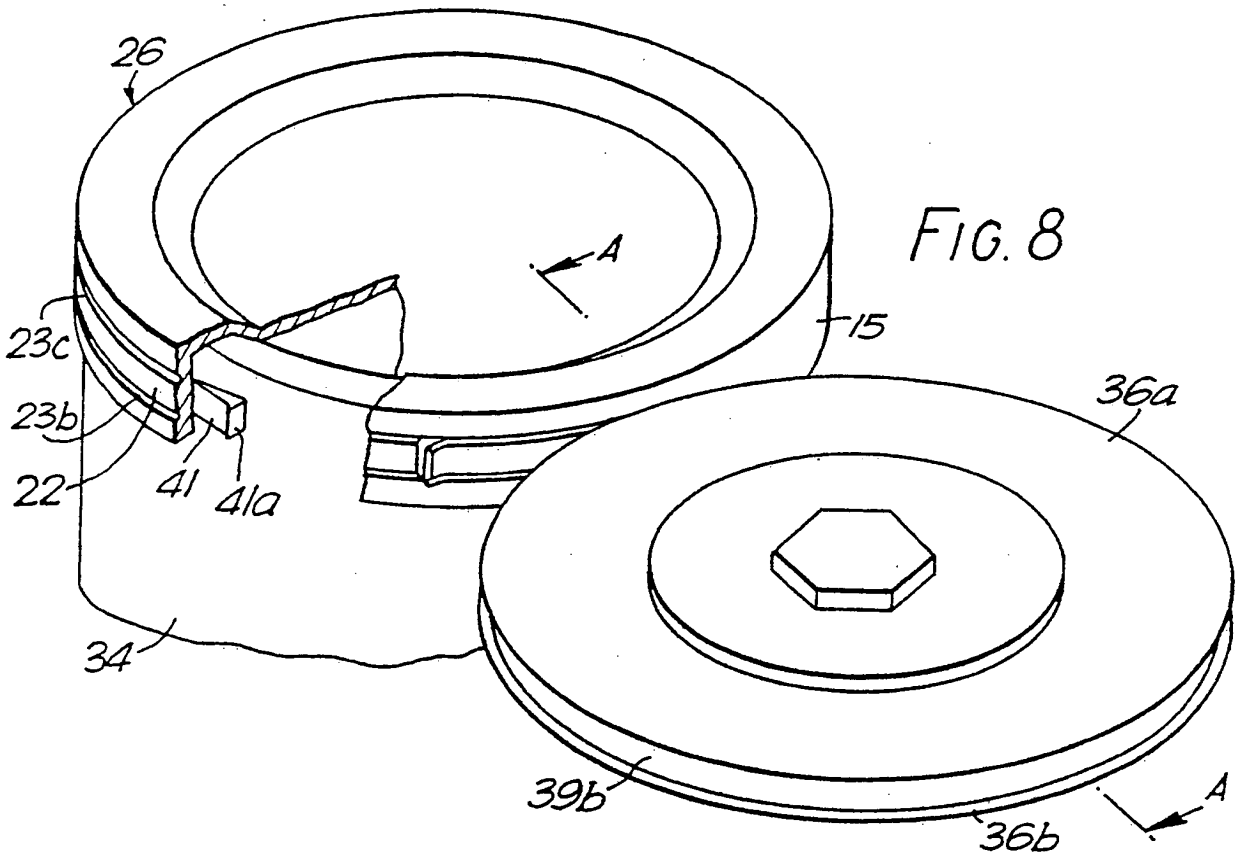

26
A
23c
23b
22
41
41a
15
36a
34
39b
36b
A

FIG. 8

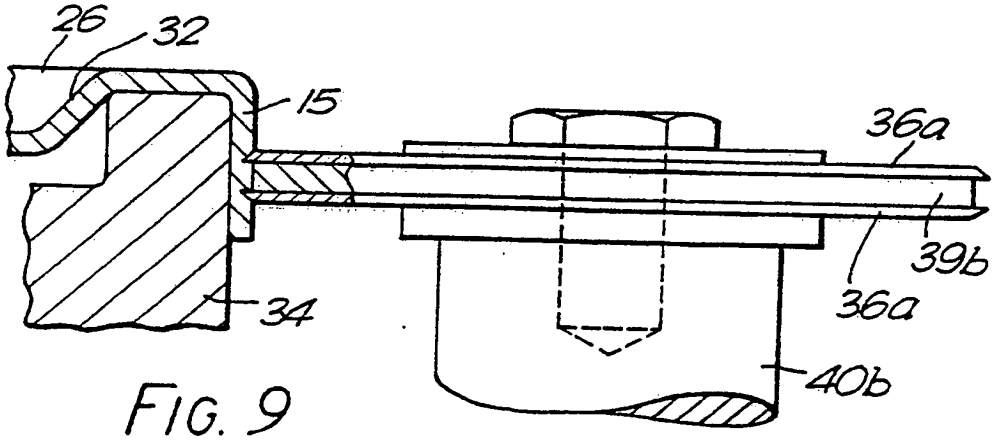
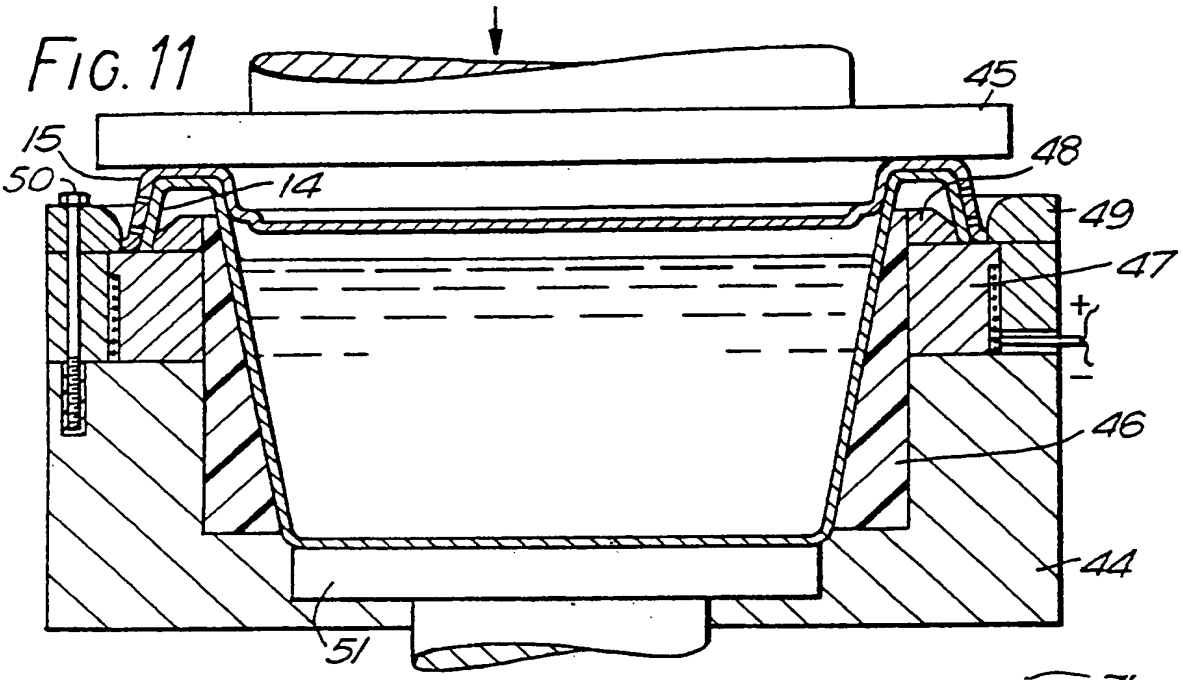

26
32
15
36a
39b
36a
34
40b

FIG. 9

FIG. 11



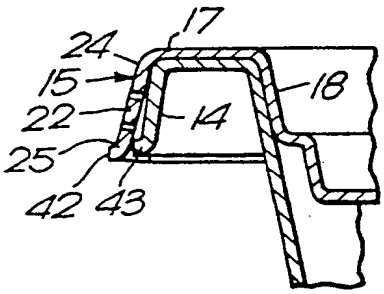


FIG. 10

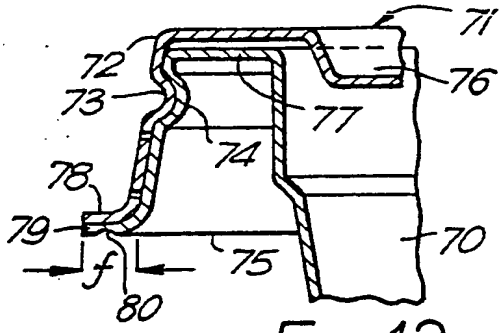
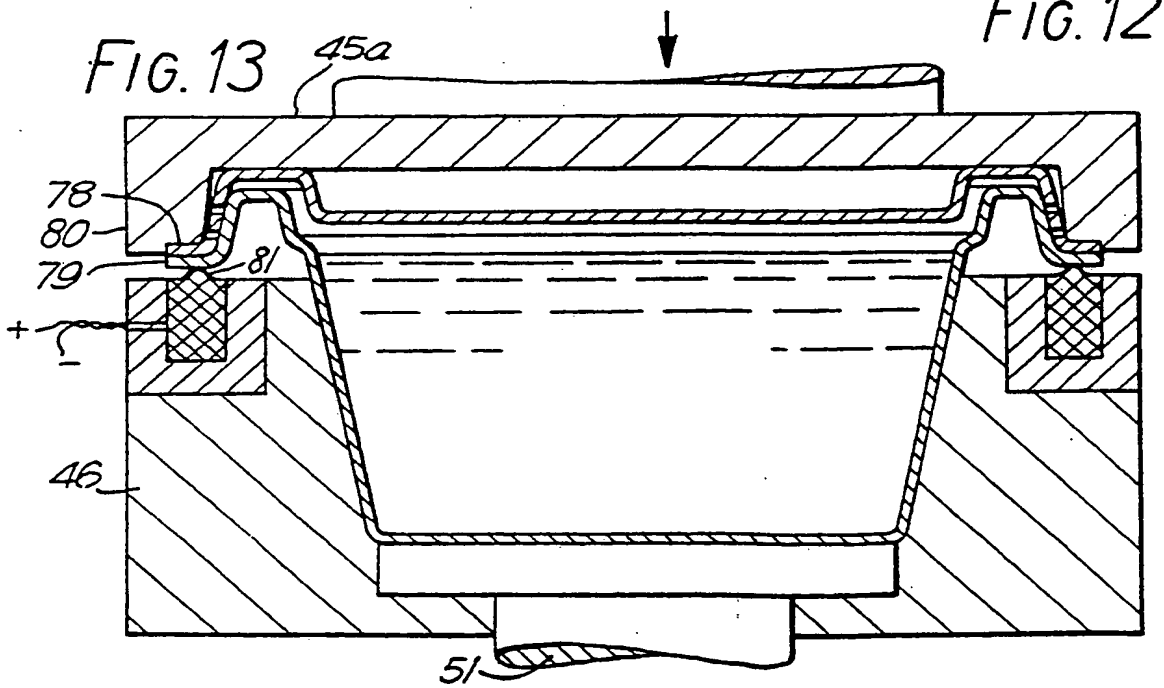


FIG. 12

FIG. 13



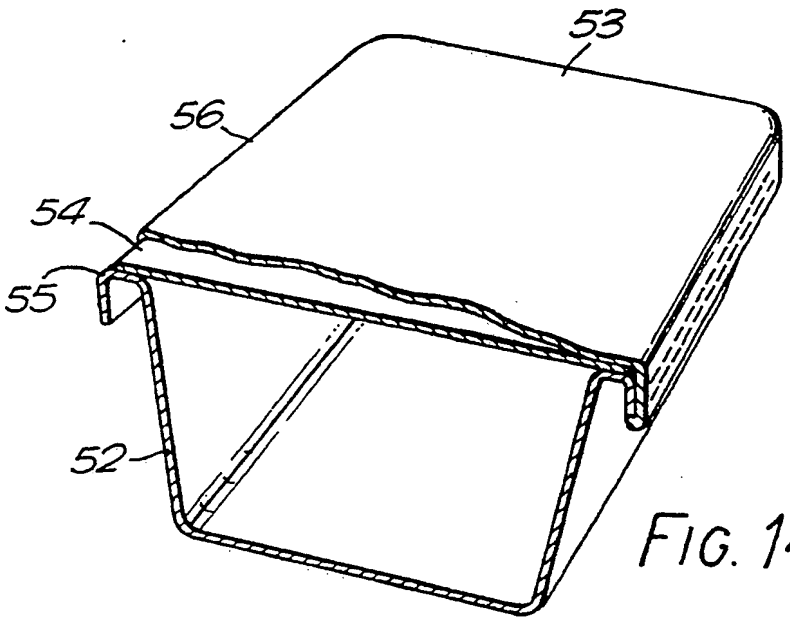


FIG. 14

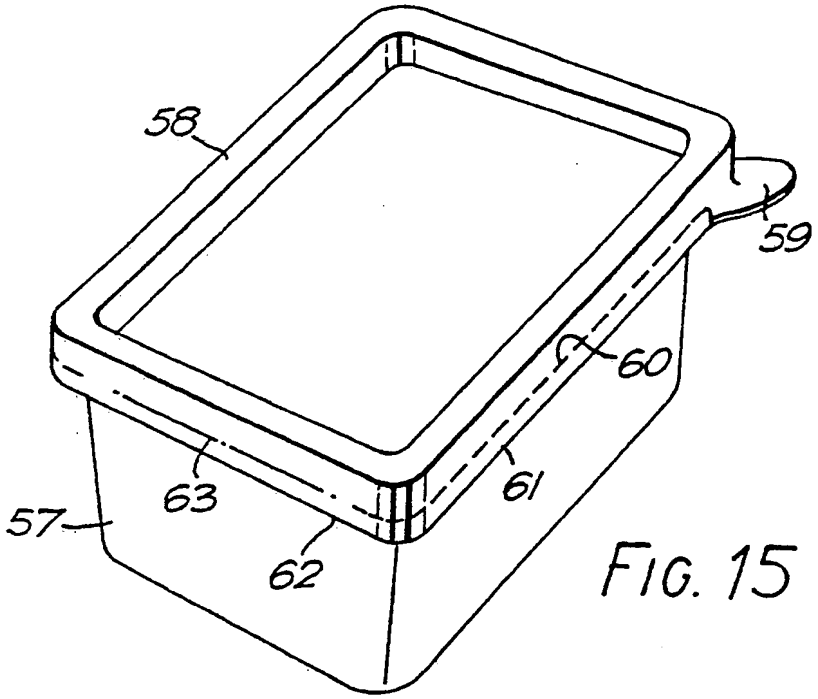


FIG. 15

CONTAINERS

This invention relates to lids for containers made of thermoplastics material and more particularly but not exclusively to lids formed by thermoforming thin thermoplastics sheet and their application to container bodies of thermoplastics material.

Thermoformed containers are extensively used to contain soft margarines and delicatessen products. A typical container body has a base, an outwardly flaring side wall upstanding from the periphery of the base, and an outwardly directed flange terminating in a peripheral skirt portion. A lid for thus container typically has a closure panel spanning the container body, a plug wall upstanding from the periphery of the closure panel, a substantially flat annular flange, and a peripheral skirt of diameter to surround the flange and skirt of the body. The skirt of the lid is usually provided with indented forms that snap fit under the skirt of the body flange to retain the lid on the body. Such containers (often called margerine tubs) are easy to open manually and also easy to reclose without any evidence of having ever been opened. One objective of this invention is to provide a lid of thin flexible thermoplastic material that has tamper indicating features. It is also desirable that the lid can be used as a reclosure. Another objective is to provide a lid that can conveniently be formed by thermoforming thin thermoplastics sheet material.

British Patent No.2161461 (HAUSTRUP) describes a container body having an outwardly directed flat flange which is joined to the body at an annular weakening zone in the form of a notch defining a reduced thickness of flange. This container is closed by a lid having a peripheral flat flange to engage the upper surface of the flat flange portion of the body to which it is welded at

an annulus outboard of the annular notch in the underside of the body flange. Whilst the annular weakening zone can be formed by injection moulding during manufacture of this body and lid these features cannot be so readily made in the thin materials used to make thermoformed articles of packaging. Disadvantages of this use of an outwardly directed flange are that abusive load in an axial direction may break the weakened zone, e.g. overriding of flanges on trays which are stacked in transit; and more particularly, that the tamper indicating weakened zone is underneath the flange and so not immediately visible to a purchaser.

British Patent No. 0174688 (CURVER) describes an injection moulded container having a side wall, a rim portion extending outwardly and downwardly from the mouth of the side wall, and a substantially vertical auxilliary wall depending from the periphery of the rim portion. This container is closed by a lid having a central panel, a plug portion extending from the periphery of the central panel, a flat annulus extending outwardly from the plug portion, and a peripheral skirt portion which surrounds the entire auxilliary wall of the body. The skirt portion and auxilliary wall are welded by an annular weld between their cylindrical surfaces so the weld is not visible to a purchaser. To open the container a user tears off the lid so breaking an annular line of weakness in the auxilliary wall of the body so that when the lid is replaced on the body the broken section again will not be visible to alert a user to the fact the container has already been opened. Furthermore, the use of an annulus of reduced thickness is not conveniently available to thermoformed lids in the position shown because the material is thin.

Accordingly a first aspect of this invention provides a thermoformed lid of thermoplastics material having a

closure panel and a skirt dependent from the periphery of the closure panel, for fixing to a container body having a rim surrounded by a peripheral skirt characterised in that the lid skirt and body skirt are substantially equal in length as measured along the axis of the skirts to permit fusion together at their free edges, and the lid skirt has a rupturable band, defined by at least one line of localised incisions extending around the skirt between an upper skirt portion and a lower skirt portion.

In one embodiment the closure panel includes a plug wall upstanding from the periphery of a central panel and an annular rim extending outwardly from the plug wall to form the rim from the extremity of which a downwardly and outwardly projecting portion extends to form the skirt.

In another embodiment, the lower edge of the downward directed skirt portion supports an outwardly directed flange designed to mate with a similar flange on the skirt portion of the container. Preferably the rupturable band is in the form of a removable band defined by a pair of lines of localised incisions extending at a distance apart.

The pair of lines of incisions may terminate at an uncut hinge portion if desired. The localised incisions may be axially aligned or staggered.

In a preferred embodiment, an incision of a first line of incisions is linked by a cross cut to an incision of a second line of incisions to define a grippable pull tab.

This invention also provides a lidded container comprising a lid and body, the free edge of the skirt, or flange of the lid being fused to the free edge of the skirt, or flange, of the container body. In a second aspect this invention provides a method of closing a container, said method comprising the steps of:

(a) providing a thermoformed lid of plastics material having a closure panel and a peripheral skirt dependent from the periphery of the closure panel, said lid skirt including a rupturable band, defined by a line of localised incisions extending around the skirt between an upper skirt portion and a lower skirt portion

(b) providing a container body of thermoplastics material having a side wall, an outwardly directed rim at the end of the side wall, and a skirt dependent from the periphery of the rim, the skirt length as measured on a central axis of the body, being substantially equal in length to the skirt length of the lid.

(c) pressing the lid onto the rim of the body to bring the free edges of lid and body into substantially the same plane; and

(d) fusing the free edges of skirt and body together.

In step (c) the free edges of lid and body skirts may be pressed together by converging guide surfaces as they are pressed to enter between the guide suraces.

In the preferred method the free edges of the lid and body skirts are fused in step (d) by abuttment with a hot plate.

In an alternative embodiment radially small outwardly projecting flanges extending from the lower extremities of the skirt portions of both lid and container are fused together using appropriately designed annular heat sealing tooling.

In a third aspect this invention provides apparatus for closing a container comprising a body having a dependent skirt at the rim and a lid having a closure panel and a dependent skirt of equal length to that of the body said apparatus comprising

means to hold the container body in axial alignment with the lid

means to press the lid onto the rim of the body to bring the free edges of the skirts of body and lid into substantially the same plane and means to apply heat and pressure to said free edges to fuse them together.

The preferred means to apply heat is a hot plate but other welding techniques, such as ultrasonic welding or hot air, may be used.

If desired the means to apply pressure may be the apparatus used to fit the lid on the body. When lateral pressure is found necessary to bring the edges of lid and body skirts together, the apparatus may include concentric converging guide surfaces to apply a pinching pressure as the lid and body skirts are pressed to enter between the guide surfaces.

As an alternative, slightly modified apparatus can be used to heat seal together outwardly projecting flanges, that extend from the lower extremities of the skirt portions of both lid and container.

Various embodiments will now be described by way of example and with reference to the accompanying drawings in which:

Figure 1 is a sectioned perspective view of a container and lid embodying prior art features;

Figure 2 is a part sectioned view of a container and lid according to this invention;

Figure 3 is an enlarged fragmentary section of a first embodiment of the lid and container;

Figure 4 is an enlarged fragmentary section of a second embodiment of the lid and container;

Figure 5 is a diagrammatic sketch of a first apparatus for forming parallel lines of incisions in a lid skirt;

Figure 6 is a sectioned side view of the rotary cutter of Figure 5;

Figure 7 is a fragmentary side view of a lid skirt having parallel lines of incisions interrupted by a hinge portion;

Figure 8 is a diagrammatic sketch of a second apparatus for forming parallel lines of reduced thickness in the lid skirt;

Figure 9 is a fragmentary section on line 'A-A' in Figure 8;

Figure 10 is a fragmentary section showing the skirts of lid and container before welding;

Figure 11 is a sectioned side view of apparatus for welding the terminal edges of the skirts of lid and body;

Figure 12 is a part-sectional view of a container and lid having their peripheral flanges welded together;

Figure 13 is a sectioned side view of apparatus for heat sealing the peripheral flanges of lid and container;

Figure 14 is a perspective sketch of a sectioned rectangular tub and lid having a heat sealed, foil diaphragm; and

Figure 15 is a perspective sketch of a third embodiment of the invention.

Figure 1 is presented to show features of the various tubs and lids already in use. In Figure 1 a tub 1 has a bottom wall 2, an outwardly flaring side wall 3 upstanding from the periphery of the bottom wall, a frustoconical annulus 4 connected to the top of the side wall 3 by a step portion 5, a flat annular rim 6 extending outwardly from the periphery of the frustoconical annulus, and a short skirt 7 depending from the periphery of the flat annular rim. Typically the tub is made by drawing the shape from a flat sheet of warmed plastics material, such as acrylonitrile-butadiene-styrene (ABS), high impact polystyrene (HIPS), polyvinylchloride (PVC) or Polypropylene (PP). The flat sheet of plastics material

is typically 0.026" thick. The bottom 2 of the tub is typically 0.018" thick and the side wall 3 typically about 0.013" thick, reflecting the fact that the shape is achieved substantially by stretch forming under the influence of vacuum, plug pressure or a combination of both while the rim is clamped. Therefore the rim 6 and skirt 7 are substantially of unchanged thickness, namely about 0.025".

The lid 8 comprises a flat central panel 9, a plug wall 10 upstanding from the periphery of the central panel, a flat annulus 11 extending outwardly from the periphery of the plug wall, and a skirt portion 12 depending from the periphery of the annulus. The skirt has a plurality of indents or dimples 13 which extend radially inwards under the skirt 7 of the tub 1 to retain the lid on the rim of the tub. The lid is also made from warmed plastics film such as ABS, HIPS, PVC or PP typically 0.009 thick so the lid is flexible.

It will be noticed that the plug wall of the lid is a very slack fit in the frustoconical annulus of the tub. This slack fit is preferred because a tight fitting plug would resist fitting in the tub and prevent snap fitting of the dimples 13 under the skirt of the tub.

The lid is easily removed by pulling off the tub and so the contents of the tub are vulunerable to tampering, after which the lid can be replaced without evidence that it has been opened at all.

This invention seeks to retain all the desirable features of the container body and lid of Fig.1 and provide (a) a secure closure, (b) means to easy opening (c) means to give visible evidence of tampering, (d) a reclosable lid after opening. Figure 2 shows a first embodiment of the invention in the form of a container having a body and lid, each thermoformed from a sheet of

thermoplastics material such as acrtylonitrile-butadiene-styrene (ABS), high impact polystyrene (HIPS), polypropylene (PP) or polyvinylchloride (PVC).

Typically the body material is in the form of sheet about 0.025" (0.6 mm) thick, and the lid is formed from sheet about 0.015" (0.4 mm) thick as discussed with reference to Figure 1.

In Figure 2 the body 1A comprises a bottom wall 2 a side wall 3 upstanding from the periphery of the bottom wall, a frustoconical annulus 4 connected to the rest of the side wall by a step portion 5, a flat annular rim 6 extending outwardly from the periphery of the frustoconical annulus, these features being similar to their counterparts on Figure 1. However, in Figure 2 it will be seen that the peripheral skirt 14, depending from the rim 6, is slightly longer in axial length than the skirt shown in Figure 1.

In Figure 2 the lid 8A has a peripheral skirt 15 substantially equal in length to the length of the body skirt 14 so that the free edges of both skirts terminate in a common plane. The edges are fused together, at an annular weld bead being denoted 16.

The lid 8A further comprises a closure panel having an annular rim portion 17 extending inwardly from the skirt 15, a plug wall 18 depending from the inner periphery of the rim portion to fit inside the annular rim 6 of the body, a lower plug wall portion 19 of smaller diameter than the plug wall 18 and connected there to by an annular ledge 20, and a central panel 21 spanning the lower plug wall. Details of the arrangement of lid and body can best be seen in Figure 3.

Referring to Figs 2 and 3 it will be seen that a removable band 22, defined by a pair of parallel lines of

localised incisions 23A, 23B extends around the skirt between an upper skirt portion 24 and a lower skirt portion 25, the terminal edge of which is fused to the terminal edge of the body skirt 14.

It will be noticed that, after fusion the lower skirt portion 25 of the lid is very small in height so that any attempt to cut off the weld to achieve illegal opening cannot be repaired by rewelding without risk of fusing the incisions to form an uncut skirt that will be visibly violated and lack a properly defined tear band.

The purpose of the step portion 5 in the body wall 3 as shown in Figure 2 is to support a foil inner cover, not shown and indeed not always necessary. Step 5 is also necessary to assist in the rapid de-nesting of empty containers as delivered to the filling plant. The step 5 is ommitted in the body side wall shown in Figure 3 to demonstrate that any problems associated with a tight fit of the plug wall 18 in the frustoconical annulus 4, may be reduced by reducing the length of plug fit.

The lid of Figures 2 and 3 is removed by tearing the removable band 22 along the lines of incisions 23A, 23B. If, by design, minimal skirt lengths are used for material economy, it is desirable that some degree of plug fit is provided to replace the lost snap fit feature shown in Figure 1.

However, Figure 4 shows a second embodiment of the lid 26 and body 27 in which somewhat increased (about 3 mm) skirt lengths 28,29 of lid and body permit incorporation of the indents 30, in the lid skirt, cooperating with an annular recess 31 of the body skirt to permit snap fitting and retention of the lid 26 on the body 27. In this embodiment there is no need for the plug wall 32 of the lid to engage the sidewall 33 of the body at all.

Figure 5 shows schematically, apparatus for simultaneously forming the pair of lines 23a, 23b, of incisions that define the removable band 22 of the lid. The apparatus comprises a rotatable mandrel 34 to support the skirt 15 and rim 17 of a lid, and a rotatable cutting wheel 35 mounted to rotate when pressed against the skirt of the lid. As drawn, the peripheral length of the cutting wheel 35 is about one third that of the lid so one rotation of the lid will create three rotations of the cutter wheel. The cutter wheel 35 comprises an upper toothed blade 36 and a lower toothed blade 37 separated by a spacer 38 as shown in Figure 6. The spacer 38 has a blade portion 39 extending parallel to the arbour 40 which supports the upper and lower blades 36,37. This spacer blade portion 39 spans a pair of incision forming teeth to constitute with them a "C" shaped blade that cuts a "C" shape to serve as a pull tab. As drawn,the apparatus will create three pull tabs on the lid skirt. If a user only removes two of the pull tabbed portions, the third segment of tear band will remain to act as a hinge if desired.

If however, a cutter wheel of equal diameter to that of the lid is used, a continuous tear band can be created. Fig.7 shows how "C" shaped cuts C,C' can be created to accommodate both left handed and right handed users and still leave a hinge.

If desired, the "C" shaped cuts may be thrust outwardly by a block 41 shown dashed on the left of mandrel 34.

In Figure 7 the incisions are drawn somewhat enlarged for clarity. The actual incision length is preferably 2 mm long (denoted "S") and the space between incisions is about 1.5 mm (denoted "g"). The tear band is about 3 mm wide (denoted "w"). These dimensions are suitable for manufacture of a removable band in lids made from

thermoplastics sheet material in a range of thickness between 0.015" (0.4 mm) and 0.025" (0.6 mm) thick although given by way of example only and the optimum incision geometry depends somewhat on the nature and thickness of polymer.

An alternative method of effecting the tear strip is shown in Fig.8 wherein non-serrated blades or wheels 36a,37a apply localised pressure to the skirt portion 15 to cause polymer thinning by cold forming. This is particularly useful for P.P. which is well known for its ease of cold forming in other applications and which in this application subsequently tears along the parallel lines of reduced thickness 23c, 23d in a most desirable fashion to leave smooth remnant edges. Again, the "C" section tab connecting the two lines is cut and thrust out using the wedge 41 in cooperation with shear action of the blades as did the twin-wheeled tool as described with reference to Fig.6. A transverse cut to complete the tear tab is made by cooperation of a barb 41a of the wedge abutting the spacer 39b as can be understood from Figs. 8 and 9.

Figure 10 shows that current practice is to cut the lid and body from the parent sheet material on a line in the plane of the sheet material so that an outwardly directed burr 42,43 is present in both lid skirt 15 and body skirt 14. This burr material is a useful source of material for fusion of the edges but, unless compressed it will give rise to a wide weld which may be unsightly.

The apparatus of Figure 9 is used to weld together the edges of the lid skirt 15 and body skirt 14 and may, if desired, be incoporated in apparatus used to fit the lid on a filled body.

In Figure 11 a first apparatus for welding the skirt of body to skirt of lid, comprises a hollow base

plate 44 and a pressure plate 45 movable towards and away from the base plate.

The base plate 44 includes sleeve 46 of thermally insulating material having an internal surface shaped to support the filled container body. The insulating sleeve 46 is surrounded by an electrically heated annulus 47 the top surface of which serves as a hot plate. An inner annular guide member 48 surrounds the insulating sleeve 46. An outer guide member 49 surrounds the first guide member 48 and is fixed to the base plate by studs, such as that denoted 50. A lifter plate 51 is slidably supported in the bottom of the base plate 44 for the purpose of lowering a filled body into the sleeve 46 and raising it out after welding of the lid skirt to the body skirt.

An external surface of the inner guide member 48 is flared to converge towards an internal surface of the outer guide member 49 with an exposed annulus of the hot plate 47 there between.

In Figure 11 the presser plate 45 is applying pressure to the skirts 14,15 of body and lid to urge them into the converging surfaces of the guide members 48,49 and into abutment with the hot plate 47. The free edges of skirts 14,15 are therefore pressed together and fused. Any parting forces arising at the compressed burrs, as already discussed with reference to Figure 8, is abated by fusion of the burrs.

After welding of the skirts 14,15 the presser place is lifted away from the base plate and the lifter plate raises the lidded container out of the sleeve 46 for removal from the apparatus.

Fig.12 shows a container body 70 and lid 71 of a kind in which the lid skirt 72 has a snap fit bead 73 engaged by an annular bead 74 of the body skirt 75 to hold a central panel 76 of the lid clear of the rim 77 of the

body. It will be noticed that both the lid skirt 72 and body skirt 75 have peripheral flanges 78,79, respectively, which overlap to be accessible for heat sealing together during application of pressure in an axial direction. A weld so produced is denoted 80. Typically the radial width "f" of the flanges 78, 79 is between 2 and 3mm. If desired, the bodies and lids already discussed with reference to Figs. 2,3,4 may be provided with this sort of peripheral flange.

Fig.13 shows apparatus for welding the flange 78 to the flange 79. The apparatus is similar to that shown in Fig.11 but a presser plate 45a has an annulus 82, an end face of which presses on the top of peripheral flange 78 of the lid to press the flange 79 of the body against a heated sealing tool 81 which is profiled to cooperate with the annulus 80 to impose a localised ring of heat and pressure. In Fig.13 the lid has been simplified (for clarity) by ommission of the snap fit features 73,74.

An advantage arising from welding of the peripheral flanges 78,79 is that thermoforming tolerances need not be as closely controlled as is necessary for the edge to edge weld of Fig.2,3, and 4. Care is taken to ensure that there is a clearance between the central panel 76 and rim 77 of the container body so that the flanges 78, 79 are able to be flat upon each other to permit welding without risk of them springing apart before the weld sets.

Figure 14 shows how the invention may be applied to a rectangular tub 52 and lid 53. In Figure 10 it will be seen that the tub is closed by a foil diaphragm 54 heat sealed to a flat rim of the tub. The lid 53 has a flat closure panel 56 to cover the foil diaphragm. For simplicity no snap fit lid features are shown, but if desired the lid skirt indents and a body groove, as shown in Figure 4, may be used.

Figure 15 shows another rectangular tub 57 and lid 58. In this embodiment the lid has a lug 59 at one corner and a single line of incisions 60 (only one visible) extends from each side of the lug and then along the skirt 61 to terminate at one end of the adjacent side 62 of the skirt. the lines of incisions do not extend across this ajacent side 62 so that a hinge 63 remains to retain the lid on the body after the lug has been pulled to tear the lines of incisions.

Lids shown in Figure 11 are welded in the manner described with reference to Figure 9 but care is taken not to weld the lug of the lid to the body skirt.

CLAIMS

1. A thermoformed lid of thermoplastics material having a closure panel and a skirt dependent from the periphery of the closure panel, for fixing to a container body having a rim surrounded by a peripheral skirt, characterised in that the lid skirt and body skirt are substantially equal in length as measured along the axis of the skirts to permit fusion together at their free edges, and the lid skirt has a removable band, defined by a line or lines of localised incisions or material thinning, extending around the skirt between an upper skirt portion and a lower skirt portion.

2. A thermoformed lid according to claim 1 characterised in that the closure panel includes a plug wall upstanding from the periphery of a central panel and an annular rim extending outwardly from the plug wall to the lid skirt.

3. A thermoformed lid according to claim 1 or claim 2 characterised in that the line or lines of localised incisions or material thinning terminate at an uncut hinge portion.

4. A thermoformed lid accoridng to any preceding claim characterised in that the incisions of a first line are staggered in respect of incisions of a second line of incisions extending parallel to the first line of incisions.

5. A thermoformed lid according to any one of claims 1 to 3 characterised in that the incisions of a first line are in axial alignment with incisions of a second line of incisions extending parallel to said first line of incisions.

6. A thermoformed lid according to claim 4 or claim 5 characterised in that an incision of a first line of incisions is linked by a cross cut to an incision of the second line of incisions to define a pull-tab.

7. A thermoformed lid according to any preceding claim in combination with a container having a sidewall, an outwardly directed rim at the end of the sidewall, and a peripheral skirt dependent from the periphery of the rim said skirt of the container being substantially equal in axial length to the length of the lid skirt.

8. A thermoformed lid according to claim 7 wherein free edges of both lid skirt and body skirt are bonded together.

9. A thermoformed lid according to claim 7, wherein an outwardly directed peripheral flange extending from the skirt of the lid is bonded to a peripheral flange of the body skirt.

10. A method of closing a container, said method comprising the steps of:

(a) providing a thermoformed lid of plastics material having a closure panel and a peripheral skirt dependent from the periphery of the closure panel, said lid skirt incuding a rupturable band, defined by lines of localised incisions or material thinning extending around the skirt between an upper skirt portion and a lower skirt portion.

(b) providing a container body of thermoplastics material having a side wall, an outwardly directed rim at one end of the side wall, and a skirt dependent from the periphery of the rim, the skirt length of the body being substantially equal in length to the skirt length of the lid.

(c) fitting the lid onto the rim of the body to bring the free edges of the lid and body into substantially the same plane; and

(d) fusing the free edges of skirt and body together.

11. A method according to claim 10 characterised in that in step (c) the free edges of lid and body skirts are pressed together by converging guide surfaces.

12. A method according to claim 9 or claim 10, characterised in that the free edges of the lid and body skirts a fused by abuttment with a hot plate.

13. A method according to claim 10, characterised in that outwardly projecting flanges extending from the lower extremities of the skirt members of both lid and container are fused together.

14. Apparatus for closing a container comprising a body having a dependent skirt at the rim and a lid having a closure panel and a dependent skirt of equal length to that of the body said apparatus comprisng:

means to hold the container body in axial alignment with the lid

means to press the lid onto the rim of the body to bring the free edges of the skirts of body and lid into substantially the same plane, and

means to apply heat and pressure to said free edges to fuse them together.

15. Apparatus according to claim 14 wherein the means to apply heat is a hot plate.

16. Apparatus according to claim 14 or 15 wherein the means to apply pressure is the means used to press the lid onto the rim of the body.

17. Apparatus according to any of claims 14 to 16 wherein the means to apply pressure include concentric, converging guide surfaces to apply a lateral pinching pressure on the skirts of lid and body to press them together.

18. Apparatus according to any one of claims 14 to 17, wherein an annular presser plate portion is supported for cooperation with an annular heat sealing tool to fuse together outwardly projecting flanges extending from the lower extremities of the skirt portions of both lid and container are fused together.

19. A lid, substantially as hereinbefore described with reference to any one of Figures 2 to 11 of the accommpanying drawings.

20. A lidded container substantially as hereinbefore described with reference to Figures 2,3,4,10,11 and 12 of the accompanying drawings.

21. A method of closing a container substantially as hereinbefore described with reference to Figure 9, 11 or 13 of the accompanying drawings.

22. Apparatus for closing a container, substantially as hereinbefore described with reference to Figure 9 and 13 of the accompanying drawings.

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